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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

In re Application of: )  
Manoj Ajbani, et al )  
For: LIGHT WEIGHT RUBBER )  
COMPOSITION CONTAINING CLAY )  
Serial No.: 10/783,135 )  
Filed: February 20, 2004 )

Docket No. DN2000-223D01  
Art Unit: 1713  
Examiner: Reddick, Marie L.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on August 24, 2004.

  
Mary A. Nicoloff

Commissioner for Patents  
P. O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

**INFORMATION DISCLOSURE IN COMPLIANCE WITH 37 C.F.R. §1.98**

This Information Disclosure Statement is being filed under 37 C.F.R. §1.97 (c)(2) and the Commissioner is accordingly authorized to deduct the \$180.00 fee specified in 37 C.F.R. §1.17(p) from Deposit Account No. 07-1725. As a means of complying with the duty of disclosure set forth in 37 C.F.R. §1.56, the Applicants are calling the following to the attention of the Patent Office and request that they be considered by the Examiner:

- United States Patent 2,885,381
- United States Patent 5,036,133
- United States Patent 2,170,191
- United States Patent 2,795,567
- United States Patent 2,969,337
- United States Patent 3,004,936
- United States Patent 3,084,117
- United States Patent 3,172,867
- United States Patent 3,208,984
- United States Patent 3,243,369
- United States Patent 3,248,314
- United States Patent 3,428,596
- United States Patent 6,469,089 B2
- EP 1029823 A2

However, the above-listed references may not be prior art under 35 U.S.C. §102 and this document should not be construed as an admission that any of the above-listed references are prior art within the meaning of 35 U.S.C. §102.

United States Patent 2,885,381 may be relevant to the prosecution of the subject patent application because it discloses a composition of matter comprising a copolymer of a conjugated diene and a heterocyclic nitrogen containing monomer having a sole  $\text{CH}_2=\text{CH}$ -substituent, such as 2-vinylpyridine, said copolymer having been compounded with 25-100 weight parts per 100 parts of said copolymer of a finely ground mineral pigment selected from the group consisting of silica and aluminum silicate as the sole reinforcing agent.

United States Patent 5,036,133 may be relevant to the prosecution of the subject patent application because it discloses a vulcanizable rubber composition that is comprised of: (A) an uncured natural or synthetic isoprene rubber, or one or more uncured butadiene-based synthetic rubbers, or uncured blends thereof, said uncured rubbers being sulfur vulcanizable, (B) a silica filler, (C) sulfur, (D) an organic accelerator and (E) a vinylpyridine-butadiene interpolymer co-activator, said interpolymer co-activator (E) containing from about 20 percent to about 65 percent by weight of vinylpyridine units, the amount of said vinylpyridine-butadiene copolymer co-activator being from about 0.5 to 2 parts by weight per 100 parts by weight of said rubber.

United States Patent 2,170,191, United States Patent 2,795,567, United States Patent 2,969,337, United States Patent 3,004,936, United States Patent 3,084,117, United States Patent 3,172,867, United States Patent 3,208,984, United States Patent 3,243,369, United States Patent 3,248,314, United States Patent 3,428,596, and United States Patent 6,469,089 B2 may be relevant to the prosecution of the subject patent application because they were cited by the Examiner in the prosecution of Serial No. 10/002,870, the parent case of this application.

European Patent Application EP1029823 A2 may be relevant to the prosecution of the subject patent application because it describes preparation of rubber composite materials. This European patent application discloses a composite clay rubber material comprising at least one material selected from the group consisting of a first composite clay material and a second composite clay material; and a rubber material; said first composite material comprising a clay mineral having interlayer section; an onium ion having 6 or more carbon atoms, bonding to said clay mineral via an ionic bond for expanding said interlayer section

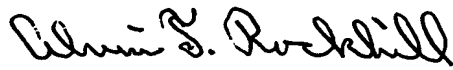
and rendering said interlayer section compatible with an organic molecule; a first guest molecule having a polar group therein being at least partially incorporated into said expanded interlayer section and bonded to said clay mineral through a hydrogen bonding between said clay mineral and said polar group; and a second guest molecule as said organic molecule without a polar group as said organic molecule being at least partially incorporated into said expanded interlayer section, said first guest molecule having a molecular length equal to or smaller than that of said onium ion, said second guest molecule having a molecular length equal to or larger than that of the said onium ion; said second composite clay material comprising a clay mineral having an interlayer section; an onium ion having 6 or more carbon atoms, bonding to said clay mineral via ionic bond for expanding said interlayer section and rendering said interlayer section compatible with an organic molecule; and a main guest molecule as said organic molecule having a polar group in a main chain and/or side chain thereof being at least partially incorporated into said expanded interlayer section and bonded to said clay mineral through a hydrogen bonding between said clay mineral and said polar group, said main guest molecule having a molecular length equal to or larger than that of the said organic onium ion-wherein said organic onium ion contained in at least one of said first composite clay material and said second composite clay material is crosslinked with at least one of said second guest molecule and said main guest molecule and a molecule of said rubber material.

The article by Wang et al., Journal of Applied Polymer Science, Vol. 78, 1879-1883 (2000) may be relevant to the prosecution of the subject patent application because it describes a process of making clay-rubber mixtures by mixing an SBR latex or a styrene-vinylpyridine-butadiene latex with the hydrophilic unmodified clay without quaternary ammonium salts. In the case of the styrene-vinylpyridine-butadiene latex and clay composite, the expansion of clay gallery in the case of styrene-vinylpyridine composite was reported to increase from 1.24 to 1.46 nm, which is not significant enough. The intercalation of the rubber was minimal and very limited exfoliation is evident from stacks of clay layers as shown in the TEM micrographs for the said composite. The limited extent of intercalation is not expected to provide substantial property enhancement in tire materials. The article does not suggest of achieving a light-weight rubber composition and a tire with improved rolling resistance. The intercalation achieved by using the organically modified modified clay with quaternary ammonium surfactant by mixing it in a solution of rubber is also described, that resulted in somewhat better intercalation or expansion of clay galleries. Nevertheless, the mixing time of 12 hours was used, which is rather long for an industrial

process. The publication does not disclose a bulk thermomechanical mixing method of making rubber-clay nanocomposite with uniform dispersion and high degree of exfoliation that will result in a light weight composition and lower hysteresis.

A copy of the above referenced foreign patent document, journal article and Form PTO-1449 are enclosed herewith.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Alvin T. Rockhill". The signature is fluid and cursive, with the first name "Alvin" and last name "Rockhill" clearly distinguishable.

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<b>FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE</b>  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use several sheets if necessary)	<b>ATTY DOCKET NO.</b> DN2000-223D01	<b>SERIAL NO.</b> 10/783,135
	<b>APPLICANT (S)</b> Manoj Ajbani, et al	
	<b>FILING DATE</b> February 20, 2004	<b>GROUP</b> 1713

**U.S. PATENT DOCUMENTS**

Examiner Initial	Document Number	Date	Name	Class	Sub-class	Filing Date if Appropriate
	2,885,381	05- 1959	Svefluk	260	41.5	
	5,036,133	07-1991	Coran	524	526	
	2,170,191	08-1939	Fisher	525	360	
	2,795,567	06-1957	Ruehrwein	521	31	
	2,969,337	01-1961	Goodwin et al	106	253	
	3,004,936	10-1961	Howland et al	524	25	
	3,084,117	04-1963	Nahin et al	522	129	
	3,172,867	03-1965	Showalter	521	91	
	3,208,984	09-1965	Dekking	521	28	
	3,243,369	03-1966	Dekking	508	136	
	3,248,314	04-1966	Nahin et al	522	79	
	3,428,596	02-1969	Strand et al	524	451	
	6,469,089 B2	10-2002	Wang et al	524	492	

**FOREIGN PATENT DOCUMENTS**

Examiner Initial	Document Number	Date	Country	Class	Sub-Class	Translation YES NO
	EP 1029823 A2	Aug. 23, 2000	Europe	C01B	33/34	X

**OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)**

Examiner Initial	
	Wang et al, <u>Journal of Applied Polymer Science</u> , "Preparation and Characterization of Rubber-Clay Nanocomposites", Vol. 78, Issue 11, 2000, pages 1879-1883
EXAMINER	DATE CONSIDERED:

Examiner: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.